WHAT IS CLAIMED IS:

1. A cross polarization interference canceller comprising:

(a) first and second signal receivers which receive signals having been transmitted through first and second polarizations vertical with each other;

(b) first and second local oscillators each of which converts one of said signals into an IF signal;

(c) first and second demodulators each of which demodulates said IF signal for producing a base-band signal and a cross polarization interference cancel reference signal;

(d) a phase-difference detector which detects a phase-difference between local signals transmitted from said first and second local oscillators, and transmits a phase-difference signal indicative of the thus detected phase-difference; and

(e) first and second phase controllers associated with said first and second demodulators, respectively, and each equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal.

2. The cross polarization interference canceller as set forth in claim 1, wherein said phase-difference detector transmits two phase-difference signals in which directions in which phases are deviated are opposite to each other, and wherein said first and second phase controllers receive said two phase-difference signals transmitted from said phase-difference detector, and transmit signals to said first and second demodulators, respectively, in which signals phase-shifting directions are opposite to each other.

3. The cross polarization interference canceller as set forth in claim 2, wherein each of said first and second phase controllers is comprised of a variable

phase-shifter.

4. The cross polarization interference canceller as set forth in claim 1, wherein each of said first and second demodulators is comprised of:

(c1) a carrier oscillator which converts frequencies of both IF signals transmitted through said first and second polarizations;

(c2) first and second analog-digital converters which convert said IF signals into first and second digital signals for said first and second polarizations, respectively;

(c3) a numerical controlled oscillator which transmits a carrier signal;

(c4) a first endless phase-shifter which receives both said first digital signal and said carrier signal, and demodulates said base band signal;

(c5) a second endless phase-shifter which receives both said second digital signal and said carrier signal, and demodulates said cross polarization interference cancel reference signal;

(c6) a filter which receives said cross polarization interference cancel reference signal, and produces a first signal indicative of interference caused by said second polarization;

(c7) an adder which adds said base band signal and said first signal to each other to thereby remove cross polarization interference;

(c8) a judgment circuit which receives an output signal transmitted from said adder, and transmits an error signal;

(c9) a carrier synchronization controller which controls a frequency of said carrier signal in accordance with said error signal; and

(c10) a tap coefficient controller which controls a tap coefficient of said filter in accordance with said error signal.

5. The cross polarization interference canceller as set forth in claim 4, wherein each of said first and second phase controllers is comprised of a variable

phase-shifter electrically connected to said second endless phase-shifter upstream thereof.

6. The cross polarization interference canceller as set forth in claim 1, wherein said phase-difference detector includes:

(d1) a multiplier which multiplies signals transmitted from said first and second local oscillators, by each other to thereby transmit a frequency-difference signal;

(d2) an analog-digital converter which converts said frequency-difference signal to a digital signal;

(d3) a numerical controlled oscillator which transmits a local phase-difference signal;

(d4) a phase comparator compares said local phase-difference signal and said frequency-difference signal to each other, and transmits a difference signal indicative of a difference between said local phase-difference signal and said frequency-difference signal; and

(d5) a filter which controls a frequency of said local phase-difference signal in accordance with said difference signal.

7. A cross polarization interference canceller comprising:

(a) first and second signal receivers which receive signals having been transmitted through first and second polarizations vertical with each other;

(b) first and second local oscillators each of which converts one of said signals into an IF signal;

(c) first and second demodulators each of which demodulates said IF signal for producing a base-band signal and a cross polarization interference cancel reference signal;

(d) a phase-difference detector which detects a phase-difference between local signals transmitted from said first and second local oscillators, and

transmits a phase-difference signal indicative of the thus detected phase-difference;

(e) first and second phase controllers associated with said first and second demodulators, respectively, and each equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal; and

(f) a reference oscillator electrically connected to both said first and second local oscillators for synchronizing said first and second local oscillators with each other.

8. The cross polarization interference canceller as set forth in claim 7, wherein said phase-difference detector transmits two phase-difference signals in which directions in which phases are deviated are opposite to each other, and wherein said first and second phase controllers receive said two phase-difference signals transmitted from said phase-difference detector, and transmit signals to said first and second demodulators, respectively, in which signals phase-shifting directions are opposite to each other.

9. The cross polarization interference canceller as set forth in claim 8, wherein each of said first and second phase controllers is comprised of a variable phase-shifter.

10. The cross polarization interference canceller as set forth in claim 7, wherein each of said first and second demodulators is comprised of:

(c1) a carrier oscillator which converts frequencies of both IF signals transmitted through said first and second polarizations;

(c2) first and second analog-digital converters which convert said IF signals into first and second digital signals for said first and second polarizations, respectively;

(c3) a numerical controlled oscillator which transmits a carrier signal;

(c4) a first endless phase-shifter which receives both said first digital signal and said carrier signal, and demodulates said base band signal;

(c5) a second endless phase-shifter which receives both said second digital signal and said carrier signal, and demodulates said cross polarization interference cancel reference signal;

(c6) a filter which receives said cross polarization interference cancel reference signal, and produces a first signal indicative of interference caused by said second polarization;

(c7) an adder which adds said base band signal and said first signal to each other to thereby remove cross polarization interference;

(c8) a judgment circuit which receives an output signal transmitted from said adder, and transmits an error signal;

(c9) a carrier synchronization controller which controls a frequency of said carrier signal in accordance with said error signal; and

(c10) a tap coefficient controller which controls a tap coefficient of said filter in accordance with said error signal.

11. The cross polarization interference canceller as set forth in claim 10, wherein each of said first and second phase controllers is comprised of a variable phase-shifter electrically connected to said second endless phase-shifter upstream thereof.

12. The cross polarization interference canceller as set forth in claim 7, wherein said phase-difference detector includes:

(d1) a multiplier which multiplies signals transmitted from said first and second local oscillators, by each other to thereby transmit a frequency-difference signal;

(d2) an analog-digital converter which converts said frequency-difference

signal to a digital signal;

(d3) a numerical controlled oscillator which transmits a local phase-difference signal;

(d4) a phase comparator compares said local phase-difference signal and said frequency-difference signal to each other, and transmits a difference signal indicative of a difference between said local phase-difference signal and said frequency-difference signal; and

(d5) a filter which controls a frequency of said local phase-difference signal in accordance with said difference signal.

13. A method of canceling cross polarization interference, comprising the steps of:

(a) receiving signals having been transmitted through first and second polarizations vertical with each other;

(b) converting said signals having been received in said step (a) into IF signals;

(c) demodulating said IF signals for producing a base-band signal and a cross polarization interference cancel reference signal;

(d) detecting a phase-difference between said IF signals and transmitting a phase-difference signal indicative of the thus detected phase-difference; and

(e) equalizing phases of said base-band signal and said cross polarization interference cancel reference signal to each other in accordance with said phase-difference signal.

14. The method as set forth in claim 13, further comprising the step of synchronizing said signals with each other.

15. The method as set forth in claim 13, wherein said step (c) includes the steps of:

(c1) converting frequencies of both IF signals transmitted through said first and second polarizations;

(c2) converting said IF signals into first and second digital signals for said first and second polarizations, respectively;

(c3) demodulating said base band signal, based on said first digital signal and said carrier signal;

(c4) demodulating said cross polarization interference cancel reference signal, based on both said second digital signal and said carrier signal;

(c5) producing a first signal indicative of interference caused by said second polarization; and

(c6) adding said base band signal and said first signal to each other to thereby remove cross polarization interference.

16. The method as set forth in claim 13, wherein said step (d) includes the steps of:

(d1) multiplying signals transmitted from local oscillators, by each other to thereby transmit a frequency-difference signal;

(d2) converting said frequency-difference signal to a digital signal;

(d3) comparing said local phase-difference signal and said frequency-difference signal to each other, and transmitting a difference signal indicative of a difference between said local phase-difference signal and said frequency-difference signal; and

(d4) controlling a frequency of said local phase-difference signal in accordance with said difference signal.